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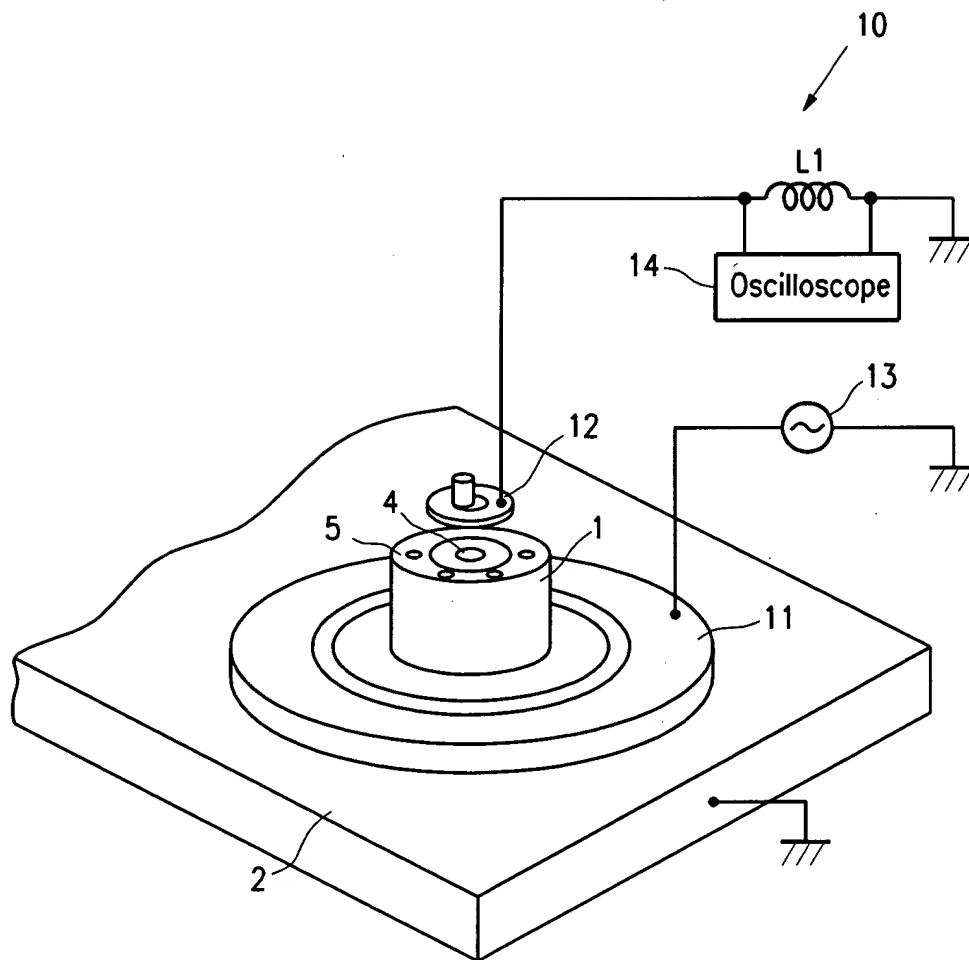


FIG. 1

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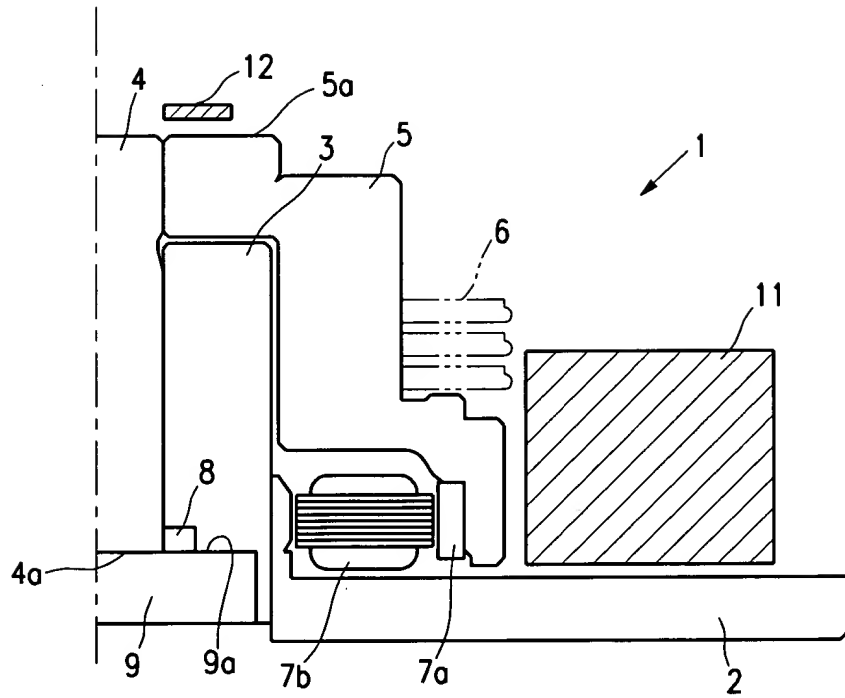


FIG. 2

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FIG. 3(a)

(In contact state)

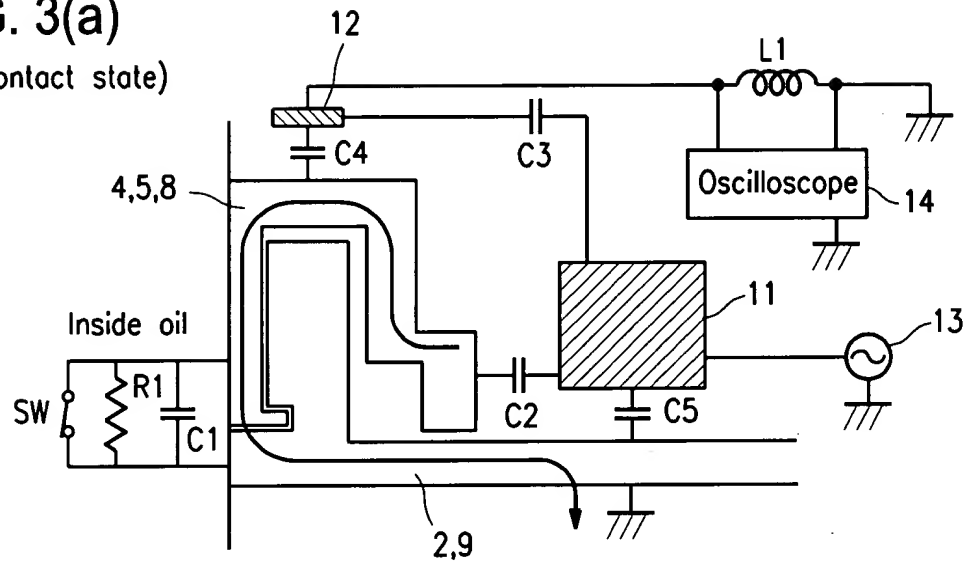
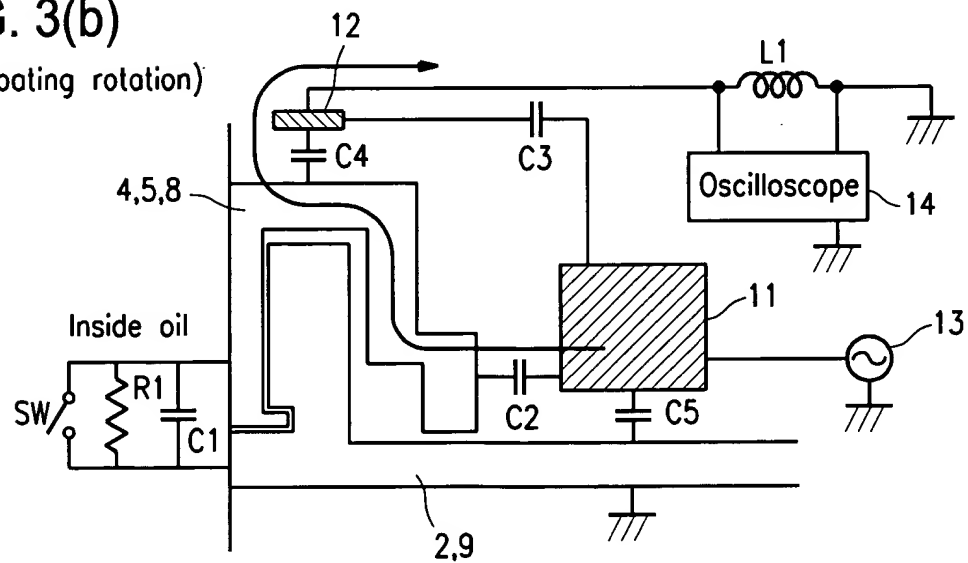


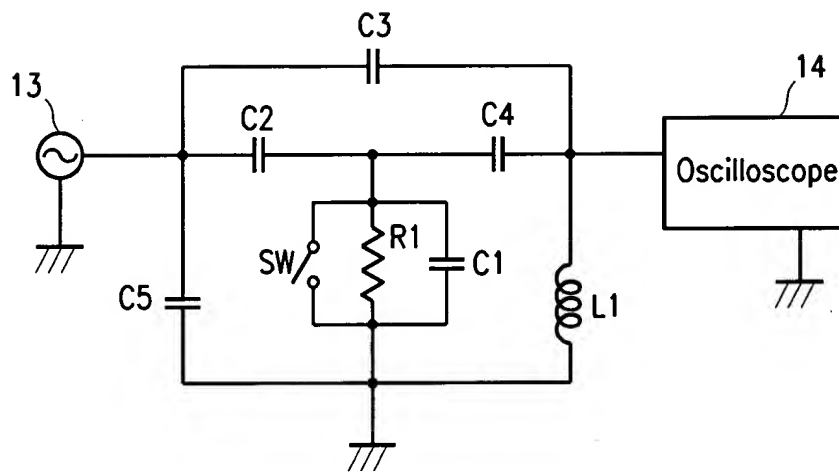
FIG. 3(b)

(In floating rotation)



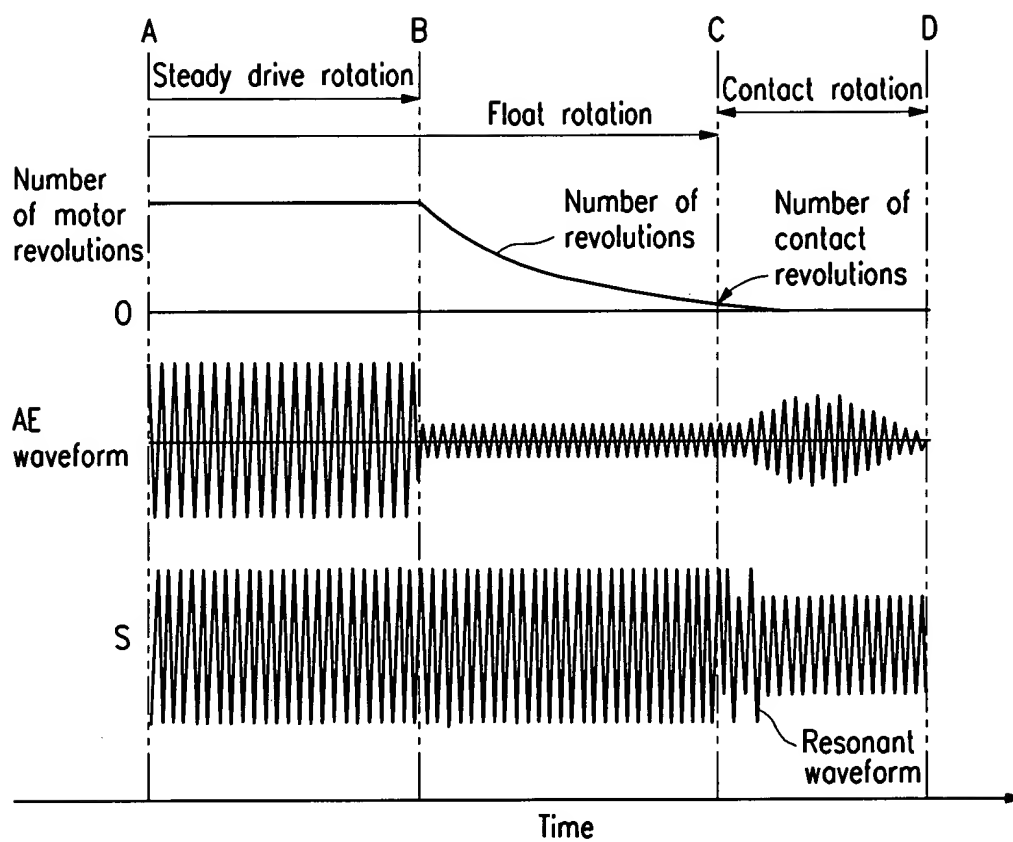
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FIG. 4



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FIG. 5



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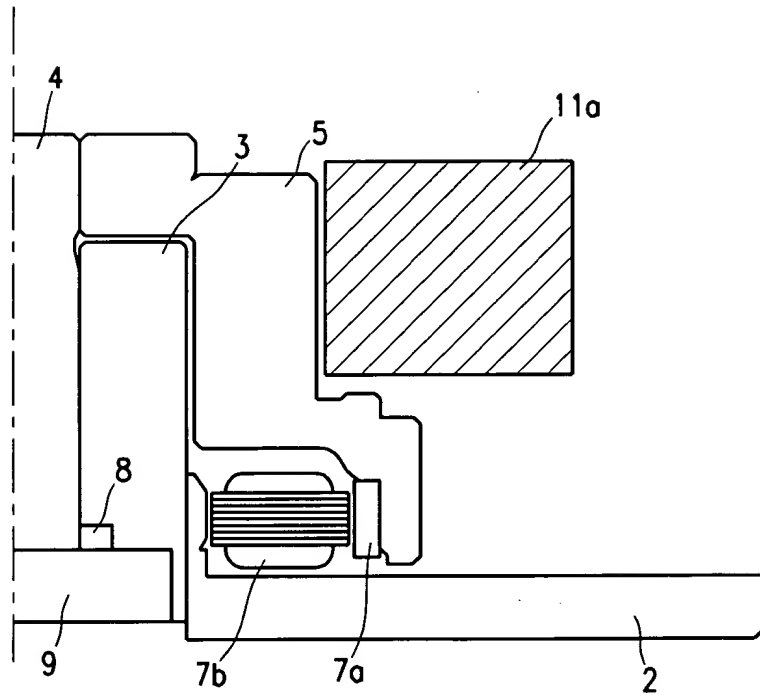


FIG. 6

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FIG. 7(a)

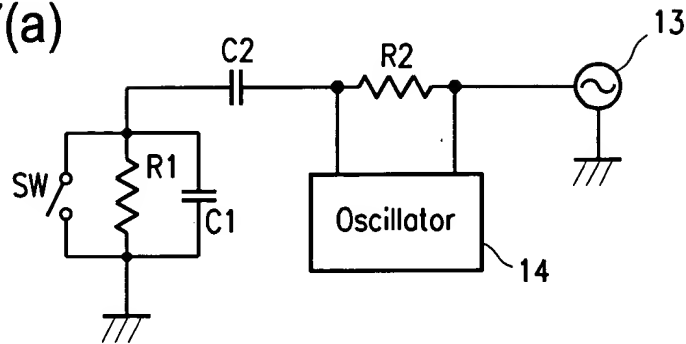


FIG. 7(b)
 (In contact state)

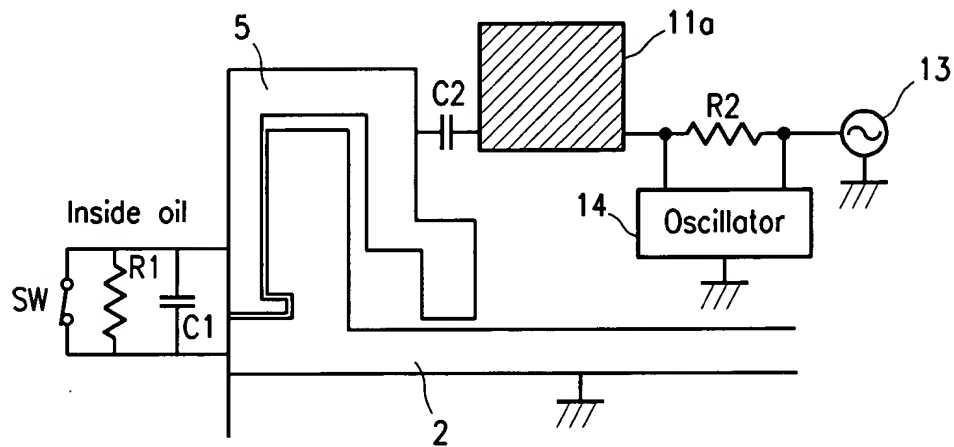
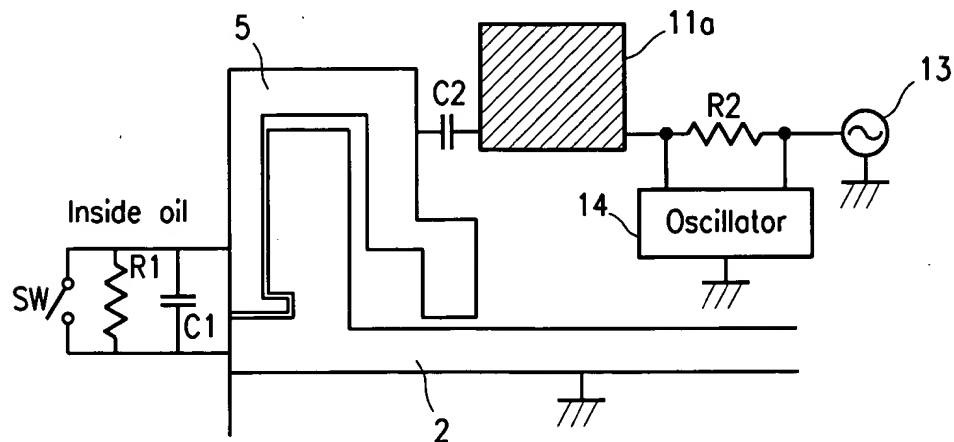
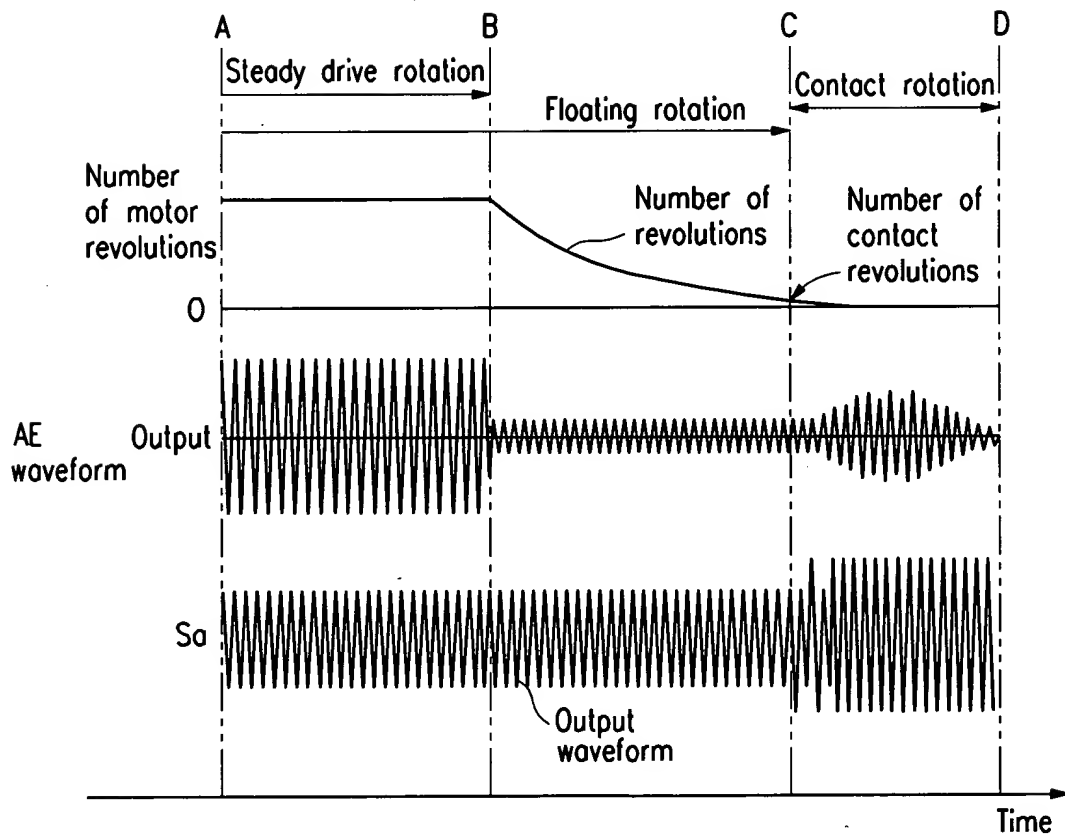


FIG. 7(c)
 (In floating rotation)



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FIG. 8



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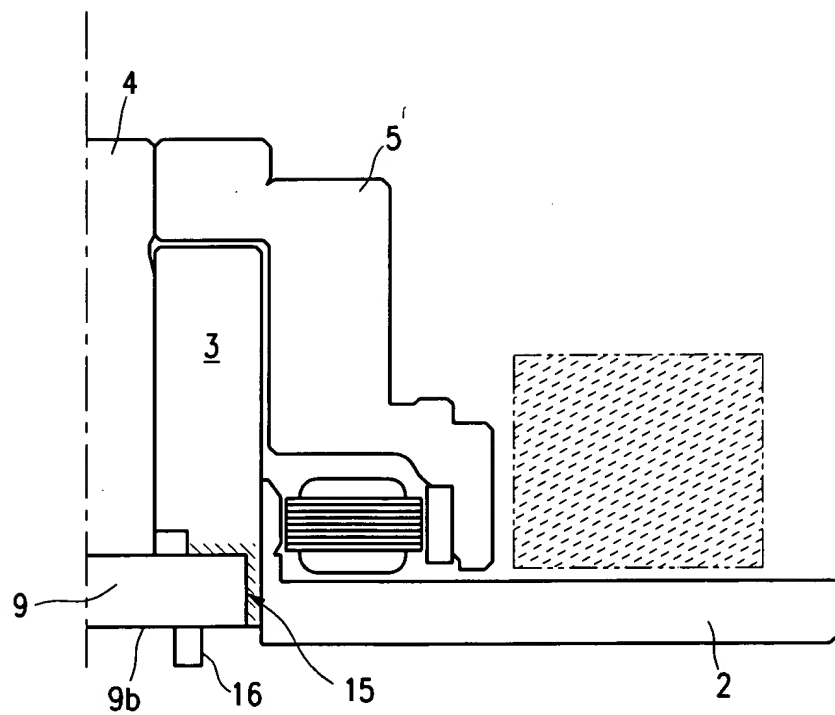
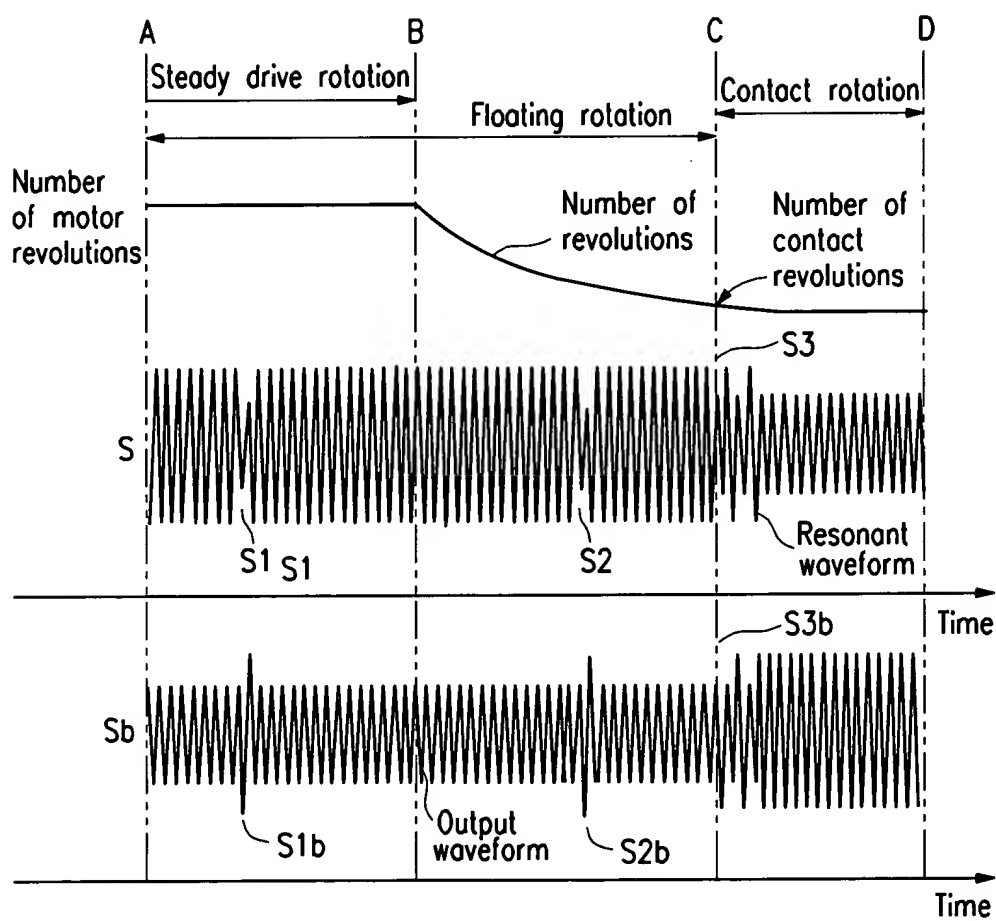


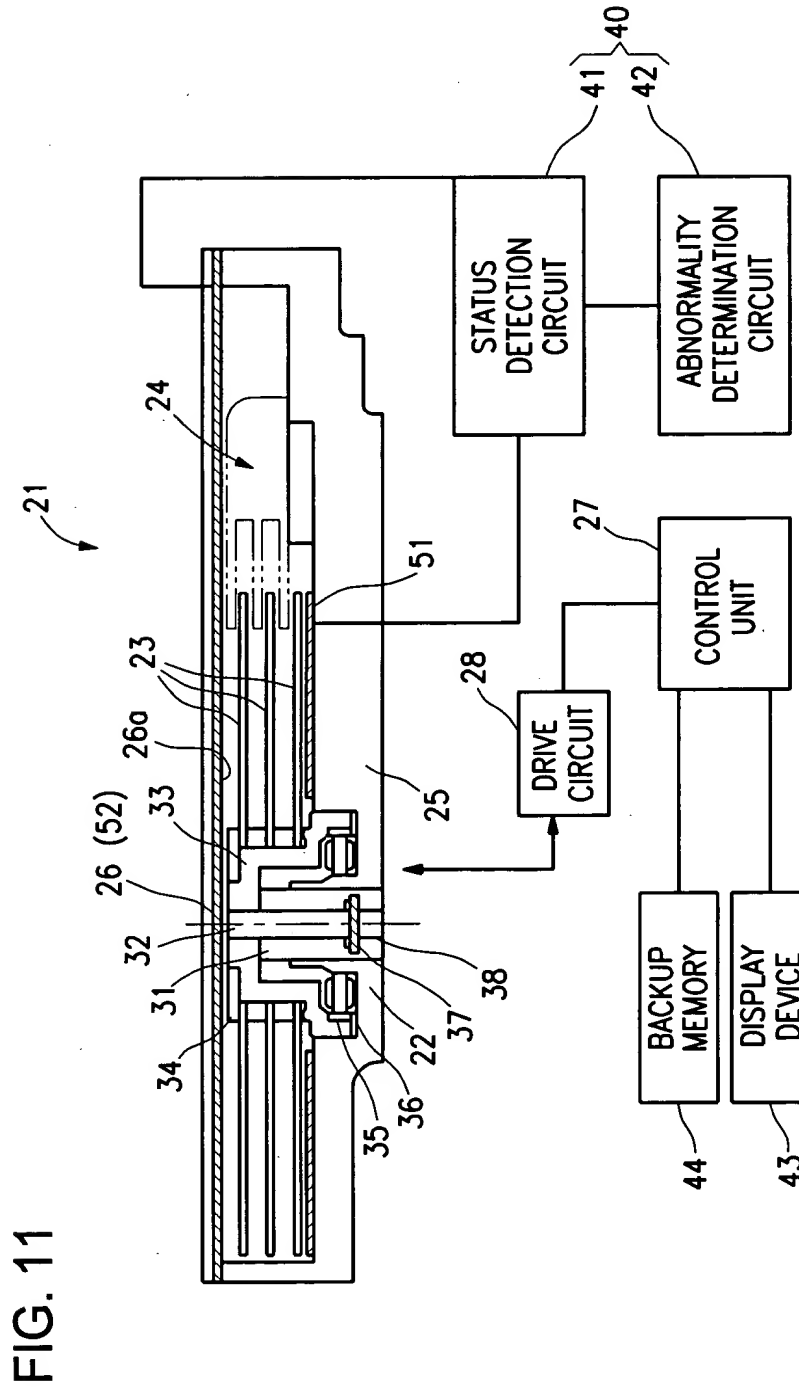
FIG. 9

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FIG. 10



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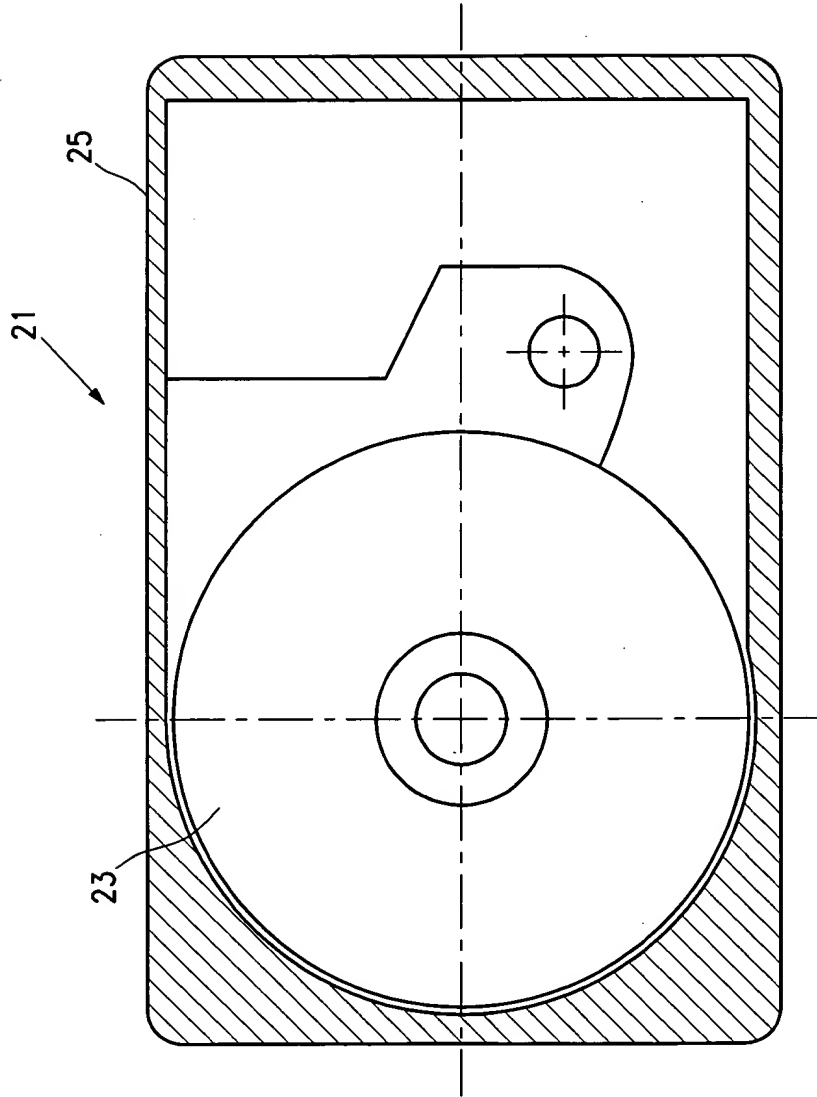


FIG. 12

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FIG. 13(a)
 (In contact state)

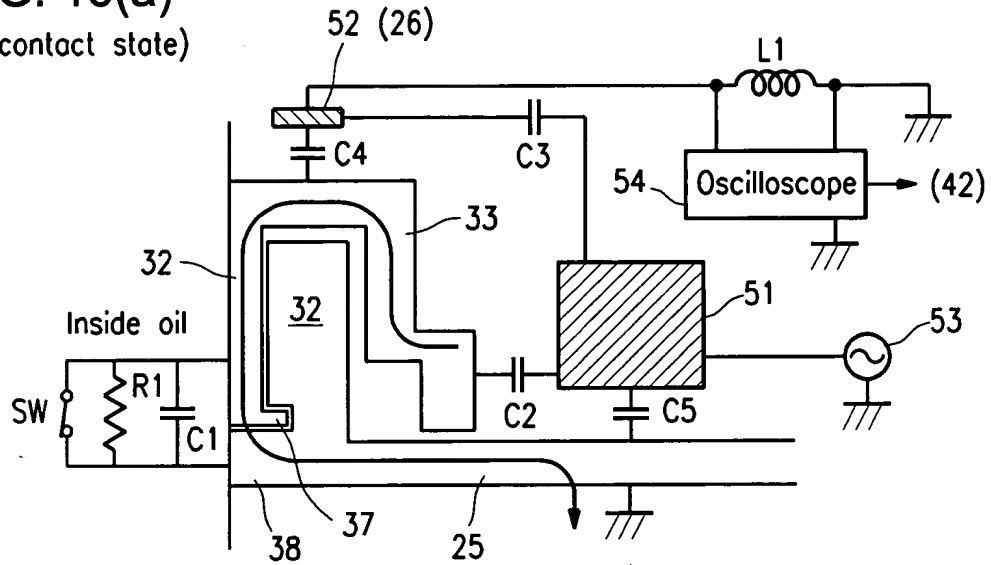
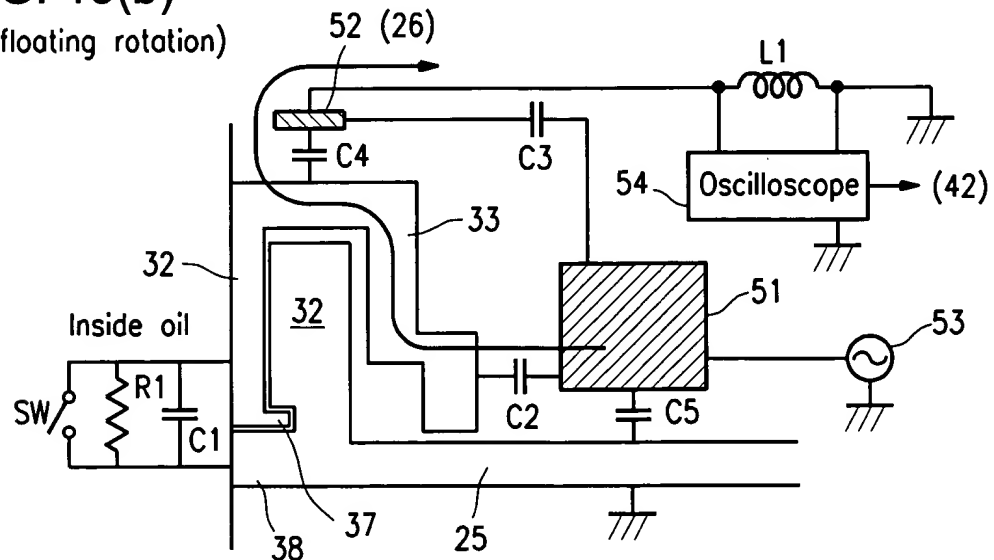
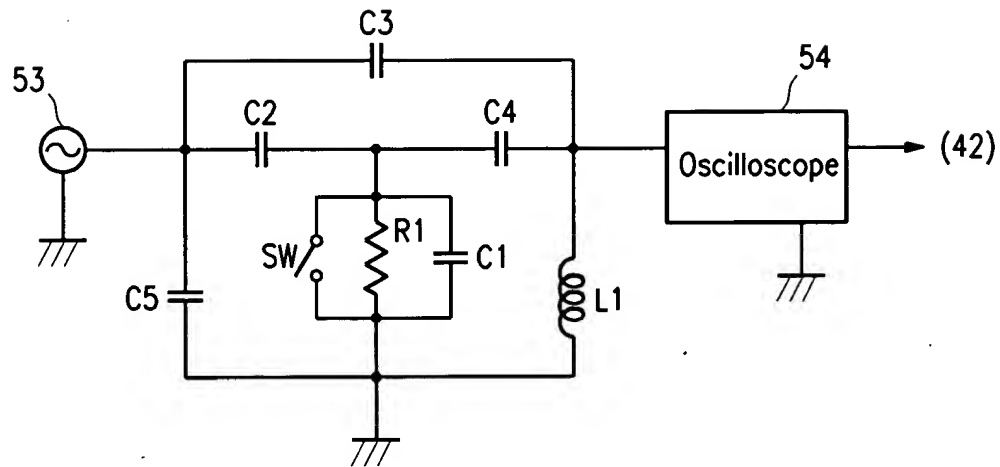


FIG. 13(b)
 (In floating rotation)



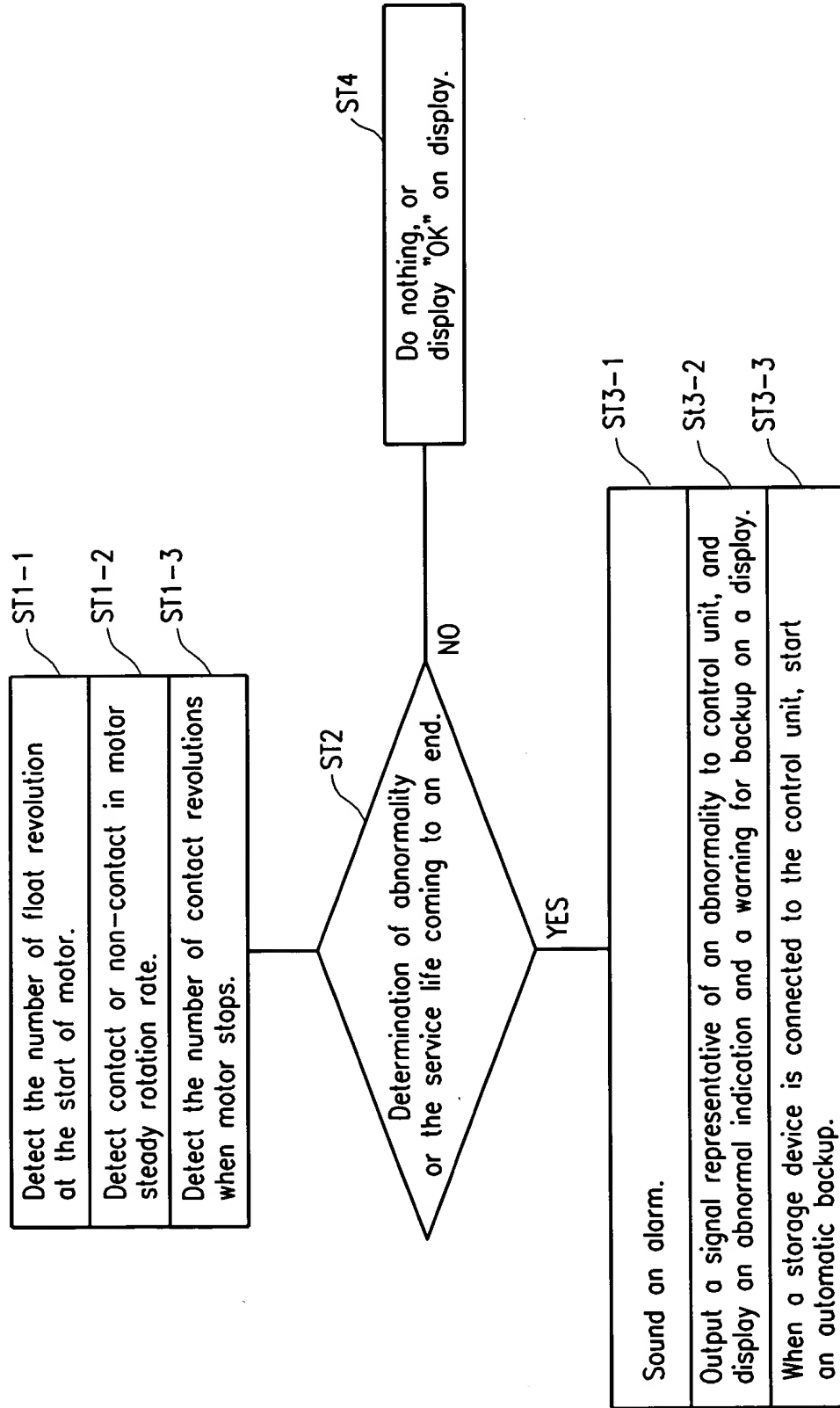
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FIG. 14



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FIG. 15 Detection based on impedance changes



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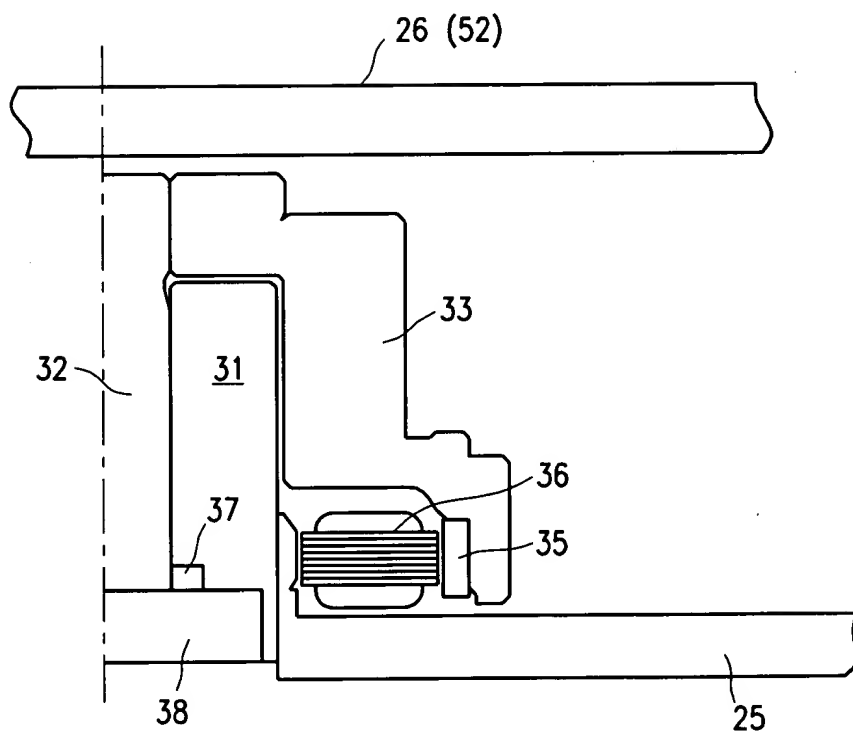


FIG. 16

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FIG. 17(a)

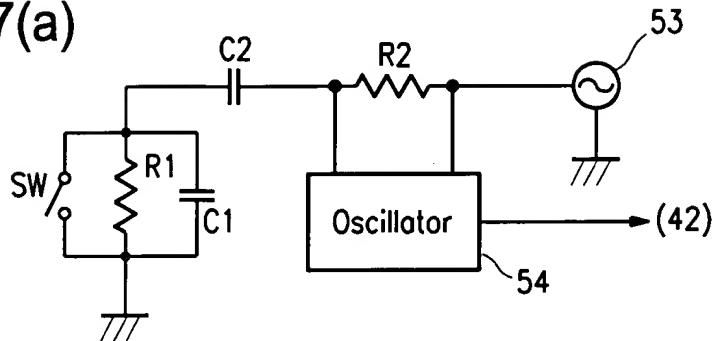


FIG. 17(b)

(In contact state)

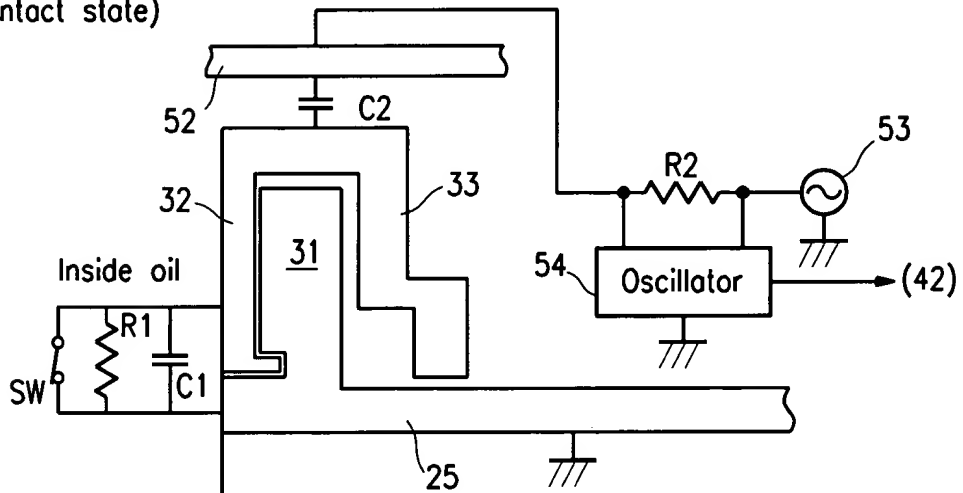
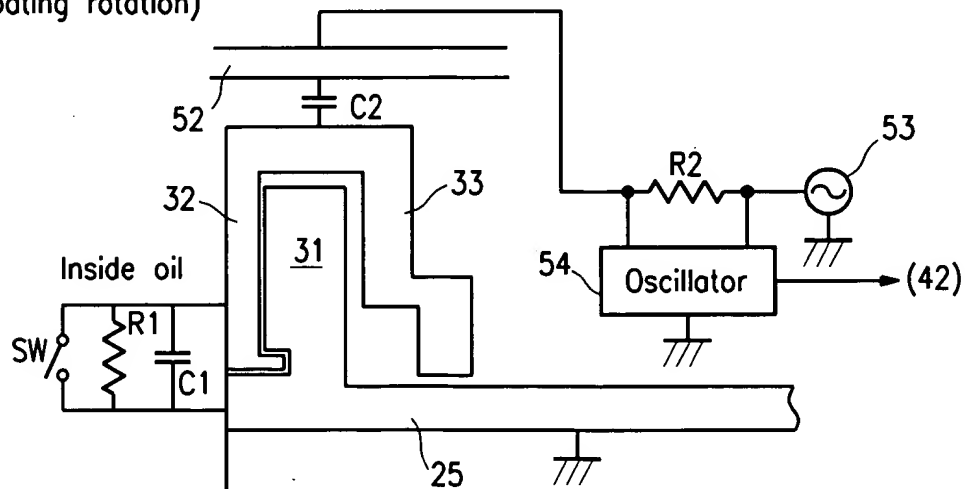


FIG. 17(c)

(In floating rotation)



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FIG. 18(a)

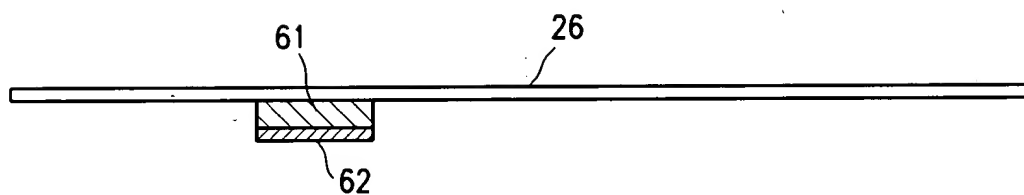
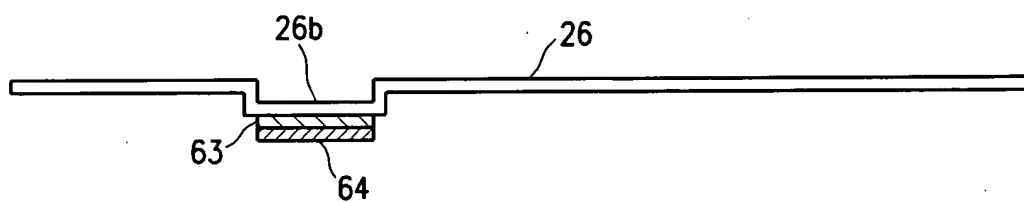
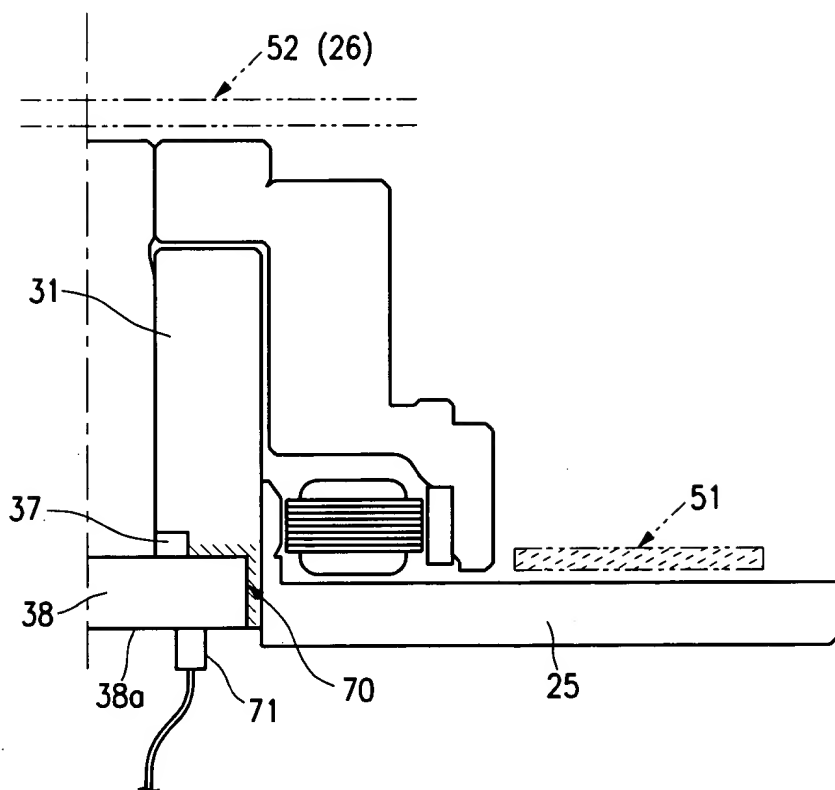


FIG. 18(b)



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FIG. 19

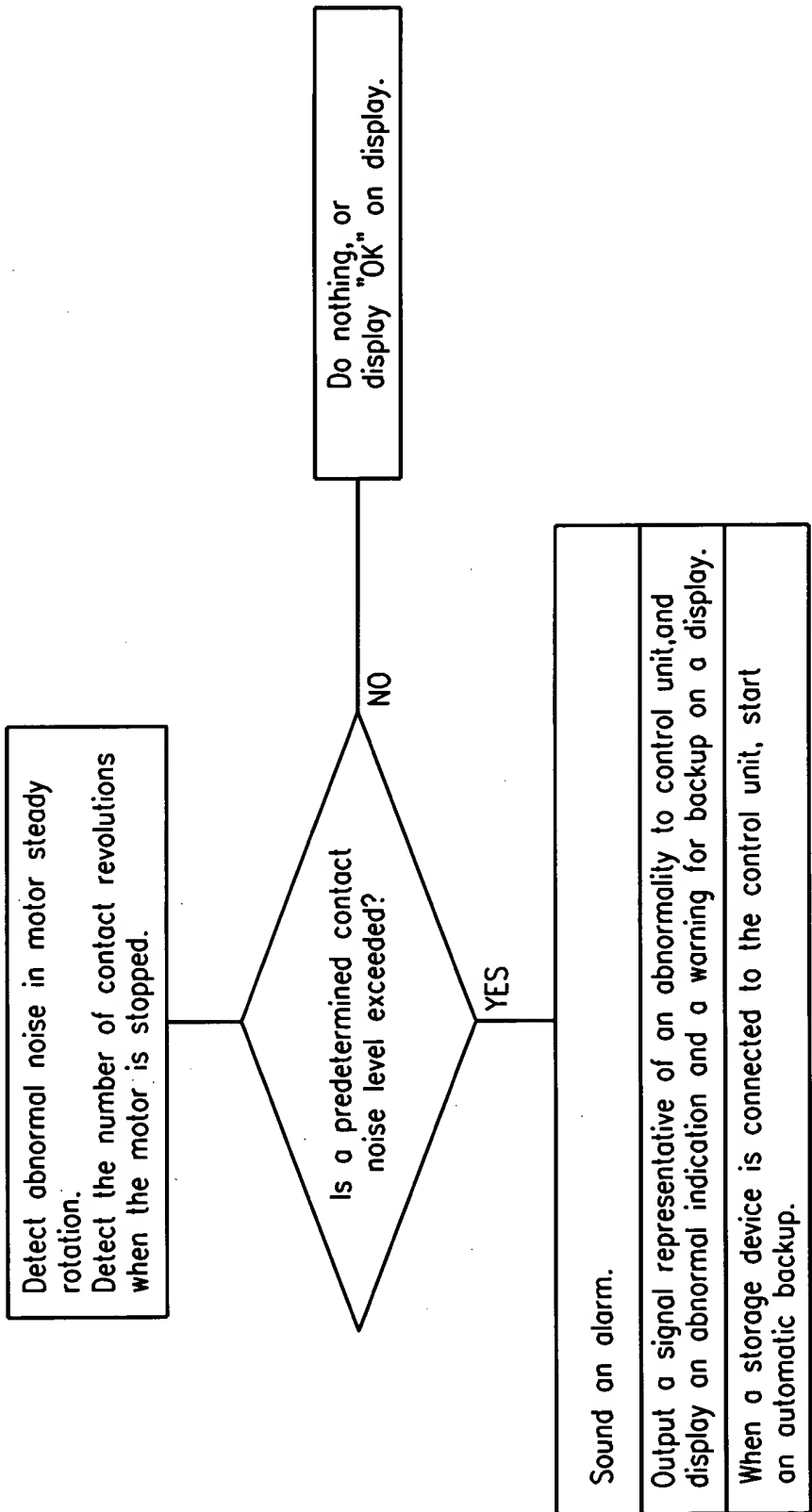




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FIG. 20

Detection of contact noise by AE sensor
AE sensor (acoustic emission) is mounted on motor or on periphery of motor



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FIG. 21

Detection based on temperature increase of motor

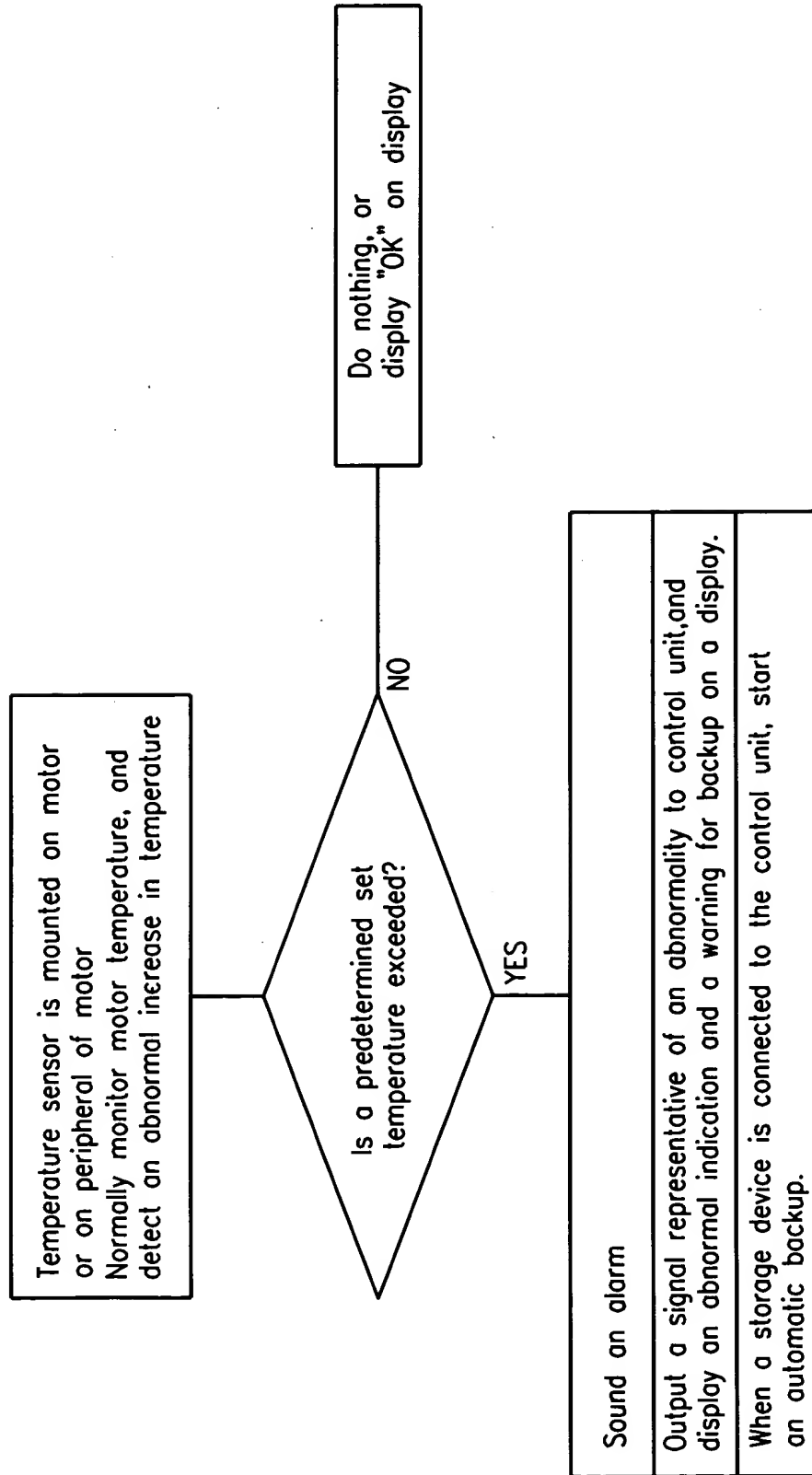
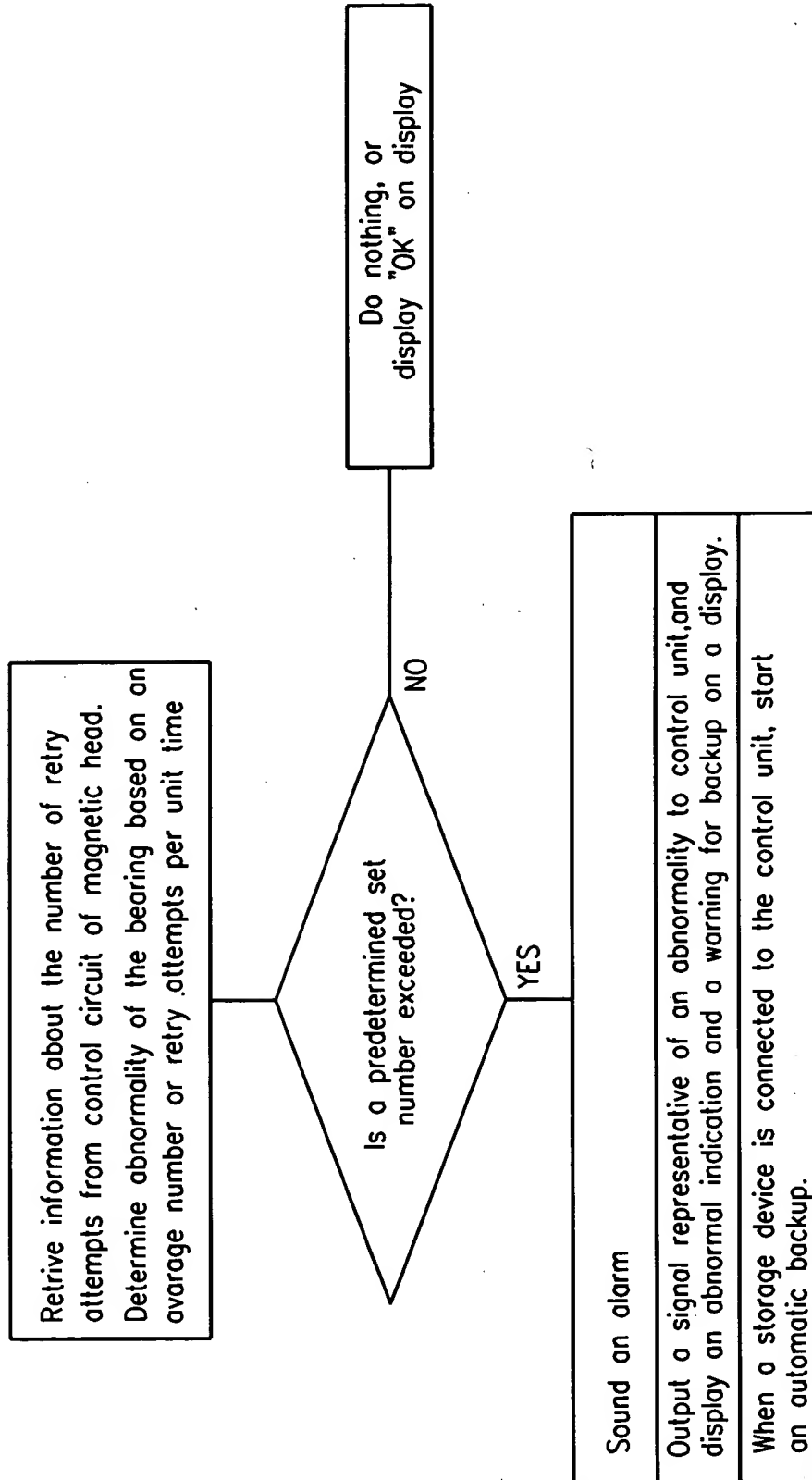


FIG. 22

Increase in the number of retry attempts of writing and reading by magnetic head



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FIG. 23

